

**NOT MEASUREMENT
SENSITIVE**

MIL-STD-1548F

19 August 2005

SUPERSEDING

MIL-STD-1548E

15 December 2003

**DEPARTMENT OF DEFENSE
STANDARD PRACTICE**

**INTO - PLANE SERVICING OF FUELS
AT COMMERCIAL AIRPORTS**



AMSC N/A

FSC 91GP

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

MIL-STD-1548F

FORWARD

1. This standard is approved for use by all Departments and Agencies of the Department of Defense (DOD).

2. Comments, suggestions, or questions on this document should be addressed to DET 3, WR-ALC/AFTH, 2430 C Street, Bldg 70, Area B, Wright-Patterson AFB OH 45433-7632 or e-mailed to AFPET.AFTH@wpafb.af.mil. Since contact information can change, you may want to verify the currency of this address information using the ASSIST Online database at <http://assist.daps.dla.mil>.

MIL-STD-1548F

CONTENTS

<u>PARAGRAPH</u>		<u>PAGE</u>
	<u>FOREWARD</u>	ii
1	<u>SCOPE</u>	1
1.1	Scope	1
1.2	Classification	1
2	<u>APPLICABLE DOCUMENTS</u>	1
2.1	General	1
2.2	Government documents	1
2.2.1	Specifications, standards, and handbooks	1
2.3	Non-Government publications	1
2.4	Order of precedence	3
3	<u>DEFINITIONS</u>	3
3.1	Definitions applicable to this standard	3
3.2	Full flow monitor cartridges	3
4	<u>GENERAL REQUIREMENTS</u>	3
4.1	Type I and Type II	3
4.1.1	Defueled product	3
4.1.1.1	Defueled JP-8+100 product	3
4.1.2	Safety	3
5	<u>DETAILED REQUIREMENTS</u>	3
5.1	Type I	3
5.1.1	Jet fuel specification and purity standards	4
5.1.1.1	Additive injection	4
5.1.2	Hydrant system checks	5
5.1.3	Aircraft fueling equipment requirements	5
5.1.3.1	Electrostatic bonding	5
5.1.3.1.1	Grounding plug	5
5.1.3.1.2	Grounding clamp	5
5.1.3.2	Aircraft pressure refueling nozzle	5
5.2	Type II	5
5.2.1	Jet fuel specifications	5
5.2.1.1	Additive injection	5
5.2.2	Maintenance and testing of fueling equipment	5
5.2.2.1	Bonding wires	5
5.2.2.2	Storage tanks	5
5.2.3	Fueling operations	5
5.2.3.1	Electrostatic bonding	5
5.2.3.1.1	Grounding plug	6
5.2.3.1.2	Grounding clamp	6
5.2.3.2	Aircraft pressure refueling nozzle	6
5.2.4	Filtration equipment	6
5.2.4.1	Filtration requirements	6
6	<u>NOTES</u>	6
6.1	Intended use	6
6.2	Acquisition requirements	6
6.3	Publications	6
6.4	Subject term (key word) listing	7

MIL-STD-1548F

CONTENTS

<u>PARAGRAPH</u>	<u>PAGE</u>
6.5 Quality assurance requirements	7
6.6 Changes from previous issue	7
TABLE	
I Defueled product quality criteria	4
II Laboratories within the continental United States	7
III Laboratories outside the continental United States	8
CONCLUDING MATERIAL	9

MIL-STD-1548F

1. SCOPE

1.1 Scope. This standard establishes two types of standard practices for into-plane servicing of fuels at commercial airports.

1.2 Classification. Classification of into-plane servicing is as follows:

Type I	Into-Plane Refueling Guidance per ATA Specification 103, Standard For Jet Fuel Quality Control at Airports.
Type II	Into-Plane Refueling Guidance as per IATA's Guidelines for Aviation Fuel Quality Control and Operating Procedures for Joint Into-Plane Fueling Services (JIG).

2. APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are specified in sections 3, 4, or 5 of this standard. This section does not include documents cited in other sections of this standard or recommended for additional information or as examples. While every effort has been made to ensure the completeness of this list, document users are cautioned that they must meet all specified requirements of documents cited in sections 3, 4, or 5 of this standard, whether or not they are listed.

2.2 Government documents.

2.2.1 Specifications, standards, and handbooks. The following specifications, standards and handbooks form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract.

DEPARTMENT OF DEFENSE SPECIFICATIONS

MIL-C-83413/4	Connector and Assemblies, Electrical, Aircraft Grounding, Plugs, for Types I and II Grounding Assemblies.
MIL-C-83413/7	Connector and Assemblies, Electrical, Aircraft Grounding: Grounding Clamp Connector for Types I and III Grounding Assemblies, Clip, Electrical
MIL-PRF-52308	Performance Specification, Filter-Coalescer Element, Fluid Pressure

(Copies of these documents are available online at <http://assist.daps.dla.mil> or from the Standardization Document Order Desk, 700 Robbins Avenue, Bldg 4D, Philadelphia PA 19111-5094.)

2.3 Non-government publications. The following documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract.

AIR TRANSPORT ASSOCIATION (ATA)

ATA Specification 103	Standards for Jet Fuel Quality Control at Airports
-----------------------	--

(Copies of these documents are available online at <http://www.air-transport.org> or from the Air Transport Association of America, 1301 Pennsylvania Ave. NW, Suite 1100, Washington, DC 20004.)

MIL-STD-1548F

AMERICAN PETROLEUM INSTITUTE/INSTITUTE OF PETROLEUM (API/IP)

API/IP Specification 1581	Specifications and Qualification Procedures for Aviation Jet Fuel Filter/Separators
API/IP Specification 1583	Specifications and Qualification Procedures for Aviation Fuel Filter Monitors With Absorbent Type Elements
API/IP Specification 1590	Specifications and Qualification Procedures for Aviation Fuel Microfilters

(Copies of these documents are available online at <http://assist.daps.dla.mil/quicksearch/> or <http://www.api.org> or from the American Petroleum Institute, 1220 L Street, Northwest Washington DC, 20005-4070.)

AMERICAN SOCIETY FOR TESTING AND MATERIALS, INC. (ASTM)

ASTM D56	Standard Test Method for Flash Point by Tag Closed Cup Tester (DoD Adopted)
ASTM D93	Standard Test Method for Flash Point by Pensky-Martens Closed Cup Tester (DoD Adopted)
ASTM D1298	Standard Test Method for Density, Relative Density (Specific Gravity), or API Gravity of Crude Petroleum and Liquid Petroleum Products by Hydrometer Method (DoD Adopted)
ASTM D1655	Standard Specification for Aviation Turbine Fuels (DoD Adopted)
ASTM D2276	Standard Test Method for Particulate Contaminant in Aviation Fuel by Line Sampling
ASTM D2624	Standard Test Methods for Electrical Conductivity of Aviation and Distillate Fuels (DoD Adopted)
ASTM D3241	Standard Test Method for Thermal Oxidation Stability of Aviation Turbine Fuels (JFTOT Procedure) (DoD Adopted)
ASTM D3828	Standard Test Method for Flash Point by Small Scale Closed Tester (DoD Adopted)
ASTM D4052	Standard Test Method for Density and Relative Density of Liquids by Digital Density Meter (DoD Adopted)
ASTM D5452	Standard Test Method for Particulate Contamination in Aviation Fuels by Laboratory Filtration (DoD Adopted)

(Copies of these documents are available online at <http://www.astm.org> or the American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohocken PA 19428-2959.)

INTERNATIONAL AIR TRANSPORT ASSOCIATION

IATA (JIG)	Guidelines for Aviation Fuel Quality Control and Operating Procedures for Joint Into-Plane Fueling Services (JIG).
------------	--

(Copies of these documents are available online at <http://www.iata.org> or from the International Air Transport Association Customer Svc, 800 Place Victoria, P.O. Box 113, Montreal Quebec, H4Z 1M1, Canada.)

MIL-STD-1548F

NATIONAL FIRE PROTECTION ASSOCIATION

NFPA 407

Aircraft Fuel Servicing

(Copies of these documents are available online at <http://assist.daps.dla.mil/quicksearch/> or <http://www.nfpa.org> or from the National Fire Protection Association, 1 Batterymarch Park, PO Box 9101, Quincy, MA 02269-9101.)

SOCIETY OF AUTOMOTIVE ENGINEERS

SAE AS5877

Detailed Specification for Aircraft Pressure Refueling Nozzle

(Copies of these documents are available online at <http://www.sae.org> or from the Society of Automotive Engineers, 400 Commonwealth Dr., Warrendale, PA USA 15096-0001.)

2.4 Order of precedence. In the event of a conflict between the text of this document and the references cited herein (except for related specification sheets), the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3. DEFINITIONS

3.1 Definitions applicable in this standard. The definitions for terms used in this standard are in accordance with ATA Specification 103 and the IATA Joint Into-plane Guidelines (JIG), with the following additional terms noted herein.

3.2 Full flow monitor cartridges. Fuse-type or fuel monitor elements, which remove free water and solid contaminants in the fuel. As the elements retain solids and water through absorption, fuel flow is restricted or shutoff.

4. GENERAL REQUIREMENTS

4.1 Type I and Type II. Receipt, storage, and issue of aviation products shall comply with ATA Specification 103 or IATA Joint Into-plane Guidelines (JIG) respectfully, except as noted herein.

4.1.1 Defueled product. Defueled product from other than U.S. Government aircraft shall not be used to refuel U.S. Government aircraft. Product defueled from U.S. Government aircraft may be returned to an authorized user and shall meet the defueled product quality criteria in Table I.

4.1.1.1 Defueled JP8+100 product. Aircraft containing JP-8+100 shall not be defueled into fuel servicing equipment unless the servicing equipment is equipped with water absorption media filter elements or API 1581, 5th Edition, M100 category filter elements. JP8+100 product can only be returned to the aircraft from which it was defueled. If the facility can not handle the JP-8+100 defuel, the aircrew shall be advised.

4.1.2 Safety. Safety requirements as specified in NFPA 407 shall apply to Type I.

5 DETAILED REQUIREMENTS

5.1 Type I. Type I refueling at Commercial Airports shall be performed as specified in ATA Specification 103, except as noted herein.

TABLE I. Defueled product quality criteria.

Property	Requirement	Test Method
Density at 15 °C (or API Gravity)	0.775-0.840 kg/L (37-51)	ASTM D1298 or D4052
Particulate contamination		
(1) Particulate content before filtration, or:	1.0 mg/L, max	ASTM D 5452
(2) Particulate content after filtration into plane,	0.5 mg/L, max	ASTM D 5452
or:		
(3) Color rating	A1,A2,B1,B2,G1, or G2	ASTM D2276
Conductivity		
Without conductivity additive	10 pS/m, max	ASTM D 2624
With conductivity additive	50-450 pS/m	ASTM D 2624
Water content into plane	15 ppm, max	See JIG or ATA 103
Appearance	Clear and Bright	Visual
Flash point	38 °C (100 °F)	ASTM D56, D93, or D3828

5.1.1 Jet fuel specification and purity standards. The requirements of ATA Specification 103 shall apply except for the following.

5.1.1.1 Additive injection. If there is a requirement to add additives to the aviation fuel, the following additive blending guidance is provided in order to assure proportional injection of the additives. The two basic methods for adding additives into fuel are hand doping and use of a proportional injector.

a. The preferred method is proportional injection using a fuel driven design injector. This type injects additives proportionately at various flow rates.

b. Hand doping additives at various points in the system can be accomplished by several techniques, some of which are described below. When hand doping is performed, additive should first be diluted with the fuel. The greater the dilution, the easier it is for the additive to be mixed properly. Fuel additives should not be mixed together in neat form as a cocktail blend for injecting into fuel.

1. Blending additives into bulk airfield tanks can be done by pouring the required quantity of additive into the tank heel followed by receipt. Care should be taken when hand doping tank heels to avoid over/under additizing that may result if the anticipated receipt unexpectedly varies in quantity or fuel received has already been additized. The required quantity of additive may also be added to delivery tank trucks just prior to offloading into bulk tanks.

2. Blending into refueling units can be performed by introducing the required amount through the top hatch using a funnel and a length of hose with one end submerged below the surface of the fuel. This can best be accomplished by pouring the additive into the refueler, filled to not more than one-third of its capacity and then filling the unit with fuel. Wait approximately 10 minutes and then circulate fuel for at least three minutes before servicing to aircraft. If additives are put into a full refueler, circulate at least 150 percent of the refueler capacity prior to issue.

MIL-STD-1548F

c. When required, fuel system icing inhibitor (FSII) may be added using the 590 mL (20 ounce) aerosol can during over-wing refueling. Determine the fuel load and calculate the amount of additive required. It should be added gradually during filling to permit proper blending in the fuel. One can of aerosol additive will inhibit 680 liters (180 gallons) of fuel to 0.087% by volume.

d. When FSII and/or SDA is injected into fuel the following concentration levels apply: Fuel injected with FSII shall contain .07 - .20 vol. % FSII content; if the fuel is injected with SDA, the SDA content shall be between 50 and 700 conductivity units (CU).

5.1.2 Hydrant system checks. The requirements of ATA Specification 103 shall apply, except that for any modifications, changes, or construction work to hydrant systems, the contractor shall also notify the contracting officer.

5.1.3 Aircraft fueling equipment requirements. The requirements of ATA Specification 103 shall apply, except for electrostatic bonding, the following specific equipment shall be required.

5.1.3.1 Electrostatic Bonding.

5.1.3.1.1 Grounding plug. When the aircraft being serviced is equipped with grounding receptacles, a grounding plug conforming to or equivalent in design to MIL-C-83413/4 shall be used.

5.1.3.1.2 Grounding clamp. When the aircraft being serviced is not equipped with grounding receptacles or a plug is not available, a grounding clamp conforming to or equivalent in design to MIL-C-83413/7 shall be used on the bonding cables of the refueling equipment. When a grounding clamp is used, it shall be connected to a bare metal surface of the aircraft.

5.1.3.2 Aircraft Pressure Refueling Nozzle. Aircraft pressure refueling nozzles shall meet the requirements of SAE AS5877.

5.2 Type II. Type II Refueling at Commercial Airports shall be performed as specified in the IATA Joint Into-plane Guidelines (JIG), except as noted herein.

5.2.1 Jet fuel specifications. The IATA guide specification, ASTM D 1655, or applicable specification cited in the contract, shall be used with the following additional requirements.

5.2.1.1 Additive injection. When additives are required, see paragraph 5.1.1.1.

5.2.2 Maintenance and testing of fueling equipment. The requirements in the IATA Joint Into-plane Guidelines (JIG) apply with the following exceptions.

5.2.2.1 Bonding wires. When testing for continuity, use either of the following methods.

a. Continuity tester N22T (Ray-O-Vac) or equivalent.

b. Simpson Model 260, Volt ohm Meter or equivalent. When using this type test equipment the resistance shall be 10 ohms or less.

5.2.2.2 Storage tanks. Storage tanks shall be inspected and cleaned as necessary whenever tank samples show a continuous solids build-up or when filtration elements on the downstream side of tanks show evidence of premature plugging from excessive solids.

5.2.3 Fueling operations. The requirements of the IATA Joint Into-plane Guidelines (JIG) apply in their entirety with exceptions noted herein.

5.2.3.1 Electrostatic Bonding.

MIL-STD-1548F

5.2.3.1.1 Grounding plug. When the aircraft being serviced is equipped with a grounding receptacle, a grounding plug conforming to or equivalent in design to MIL-C-83413/4 shall be used.

5.2.3.1.2 Grounding clamp. When the aircraft being serviced is not equipped with grounding receptacles or a plug is not available, a grounding clamp conforming to or equivalent in design to MIL-C-83413/7 shall be used on the bonding cables of the refueling equipment. When a grounding clamp is used, it shall be connected to a bare metal surface of the aircraft.

5.2.3.2 Aircraft Pressure Refueling Nozzle. Aircraft pressure refueling nozzles shall meet the requirements of SAE AS5877.

5.2.4 Filtration equipment. The filtration equipment requirements in the IATA Joint Into-plane Guidelines (JIG) apply in their entirety with exceptions noted.

5.2.4.1 Filtration requirements. All aviation fuel shall pass through two filters. One filter shall be at the inlet to the operating tank and one filter shall be on the fueller-loading rack or hydrant delivery lines. The initial filter may be a filter separator, micronic filter, or full-flow monitor cartridge type device. The final filtration of jet fuel shall be through a filter separator or a full flow monitor. One of the two filters used for aviation gasoline shall be a filter separator or fuel monitor. The filter separator shall meet the requirement of API 1581 or MIL-PRF-52308. The full-flow monitor shall meet the requirements of API 1583 or MIL-PRF-81380. The micronic filter shall meet the requirement of API 1590. Filtration equipment shall be designed so that fuel bypass is not possible.

6. NOTES

(This section contains information of a general or explanatory nature that may be helpful, but is not mandatory.)

6.1 Intended use. The purpose of this standard is to ensure government aircraft are provided specification fuel at commercial facilities where a US Government Into-Plane Servicing Contract is in force. The JP-8+100 defueling procedures covered by this standard are unique as only DoD aircraft use JP-8+100. Defuelings of JP-8+100 at commercial airports must be handled appropriately to avoid contaminating systems not capable of handling the JP-8+100. Additive injection procedures mentioned in this standard are also military unique as the additive package required in fuel used by DoD aircraft is not used in commercial fuels - the additive package required in fuel destined for DoD aircraft is required as it provides additional safeguards against fuel system icing and fuel system static charges.

6.2 Acquisition requirements. Acquisition documents should specify the title, number, and date of this standard.

6.3 Publications. The JIG publication referred to in Type II of the detailed requirements is available through two sources. It is prepared by and for members of the Joint Inspection Group, participants of the JIG can obtain the document through corporate channels. The JIG guidance referred to in Type II has also been written into the International Air Transport Association (IATA) Joint Into-Plane Guidance Material for Aviation Turbine Fuels Quality Control and Operating Procedures, 1st Edition. It is identical to the JIG used by JIG participants. The 1st Edition of the IATA publication can be procured from IATA Customer Svc, 800 Place Victoria, P.O. Box 113, Montreal Quebec, Canada, H4Z 1M1, Fax (514) 874-9659.

MIL-STD-1548F

6.4 Subject term (key word) listing.

Aviation Gasoline
Commercial Jet Fuels
Jet Fuels
Refueling at Commercial Airports

6.5 Quality assurance requirements. Quality assurance requirements imposed as part of any contract may include sample submission to one of the laboratories listed in Table II or Table III of this standard.

TABLE II. Laboratories within the continental United States.

Mailing Address	Shipping Address	Telephone Numbers	FAX Numbers	Area of Responsibility
Det 3, WR-ALC/AFTLA Bldg 70, STE 01 2430 C St, Area B WPAFB OH 45433-7632	Det 3, WR-ALC/AFTLA Bldg 70, STE 01 2430 C St, Area B WPAFB OH 45433-7632	DSN 785-0739 COM (937) 255-0739	DSN 986-7744 COM (937)255-8088	AL, AR, CT, DC, DE, FL, GA, IA, IL, IN, KS, KY, LA, MA, MD, ME, MI, MN, MO, MS, NC, NE, NH, NJ, NY, OH, OK, PA, RI, SC, SD, TN, TX, VA, VT, WI, WV
Det 3, WR-ALC/AFTLE 1747 Utah Ave, Bldg 6670 Vandenberg AFB CA 93437-5220	Det 3, WR-ALC/AFTLE 1747 Utah Ave, Bldg 6670 Vandenberg AFB CA 93437-5220	DSN 276-6263 COM (805) 606-6263	DSN 276-2756 COM (805) 606-2756	AZ, CA, CO, ID, MT, ND, NM, NV, OR, UT, WA, & WY
Army Petroleum Center ATTN: AMSTA-LC-CJPT U Avenue, Bldg 85-3 New Cumberland, PA 17070-5005	Army Petroleum Center ATTN: AMSTA-LC -CJPT U Avenue, Bldg 85-3 New Cumberland, PA 17070-5005	DSN 771-6511 COM (717) 770-6511	DSN 771-4743 COM (717) 770-4743	All States

6.6 Changes from previous issue. The margins of this standard are marked with vertical lines to indicate where changes from the previous issue were made. This was done as a convenience only and the Government assumes no liability whatsoever for any inaccuracies in these notations. Bidders and contractors are cautioned to evaluate the requirements of this document based on the entire content irrespective of the marginal notations and relationship to the last previous issue.

TABLE III. Laboratories outside the continental United States.

Mailing Address	Local Shipping Address	Telephone Numbers	Fax Numbers
Det 3, WR-ALC/AFTLF Unit 5025 Box 495 APO AE 09459-5025	Det 3, WR-ALC/AFTLF RAF Mildenhall, Bldg 725 Bury ST Edmunds Suffolk, England IP28 8NF	DSN 314-238-2043 COM 44-1-638-542043	DSN 314-238-3626 COM 44-1-638-543626
Det 3, WR-ALC/AFTLG Aerospace Fuels Lab Unit 5161 APO AP 96368-5161	Det 3, WR-ALC/AFTLG Bldg 854 Kadena, AB Okinawa, Japan 96368-5161	DSN 315-634-3394/1602 COM 611-734-3394	DSN 315-634-0584
505th QM Battalion APAJ-GO-QL Unit 35130 APO AP 96376-5130	505th QM Bn Petrol Lab Attn: APAJ-GO-QL Unit 35130 Kadena AFB, Okinawa	DSN 315-632-4058 COM 81-6117-324058	DSN 315-634-1376 COM 81-6117-34137693043
Code 704, FISC Yokosuka Hakozaki Fuel Department PSC 473, Box 11 FPO AP 96349-0011	FISC Tsurumi Hakozaki Laboratory PSC 471 FPO AP 9634 7-2000	DSN 244-2733 COM 81-311-734-2733	COM 81-311-734-7050
FISC Pearl Harbor POL Lab Code 704 1942 Gaffney St, Suite 100 Pearl Harbor HI 96860-4549	FISC Pearl Harbor POL Laboratory Code 704 Bldg 1685, Neches Ave. Pearl Harbor HI 96860-4549	DSN 315-473-0239 COM (808) 473-0239	DSN 315-473-1566 COM (808) 473-1566
FISC Yokosuka, Fuel Department Sasebo Fuel Division Laboratory Branch Code 702.3, PSC 476, Box 6 FPO AP 96322-1504	FISC Yokosuka DetSasebo POL Laboratory PSC 476, Box 7 FPO AP 96322-1504	DSN 315-252-4134 COM 81-956-24-6111 Ext 4134	DSN 252-4139 COM 81-956-24-0968 Ext 4137
DEO-A Attn: Laboratory 6-920 12th Street Elmendorf AFB AK 99506	Fuels Laboratory Bldg 986 Ft Richardson AK 99505	DSN 317-384-7180 COM (907) 384-7180	DSN 317-384-2447 COM (907) 384-2447
DESC Europe Petroleum Laboratory CMR 422 APO AE 09067	DLA/DESC Europe Pet. Lab Rhein Ordnance Barracks Bldg 320 Am Opelkreis 67663 Kaiserslautern, Germany	DSN 314-493-2286/7/8 COM 49-631-3406-2286/7/8	DSN 314-493-2289 COM 49-631-3406-2289

MIL-STD-1548F

CONCLUDING MATERIAL

Custodians:

Army – AV
Navy – AS
Air Force – 68
DLA – PS

Preparing activity:

Air Force – 68
(Project 91GP-1193)

Review activities:

Army – CD
Navy – SA
Air Force – 99
DLA – CC

Note: The activities listed above were interested in this document as of the date of this document. Since organizations and responsibilities can change, you should verify the currency of the information above using the ASSIST Online database at <http://assist.daps.dla.mil>.